Caryocolum siculum sp. n. (Gelechiidae), feeding on *Gypsophila* (Caryophyllaceae) in Sicily

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Abstract. *Caryocolum siculum* sp. n. from Central and South-Eastern Sicily (Italy) is described. Its larva feeds inside the internode of stems of *Gypsophila arrostii* Guss. (Caryophyllaceae). Morphological and bioethological data on adult, larva and pupa are provided.

Riassunto. L'Autore sulla base della diversa conformazione delle strutture genitali di entrambi i sessi, descrive *Caryocolum siculum* sp. n. Il nuovo taxon, appartenente al *petryi*-gruppo, è stato ottenuto dall'allevamento delle larve rinvenute nella Sicilia centrale (Monti Erei, Agira) e sud-orientale (Monti Iblei, Vizzini); le larve si nutrono e vivono all'interno del fusto della Caryophyllaceae *Gypsophila arrostii* Guss. Vengono forniti dati morfologici e bioetologici relativi ad adulto, larva e pupa, ottenuti da osservazioni effettuate direttamente sul campo ed in laboratorio.

Introduction

In the present paper a new species of *Caryocolum*, recently discovered in Central and South-Eastern Sicily (Iblei and Erei Mountains), is described. It was obtained from larvae feeding in galls of *Gypsophila arrostii* Guss. (Caryophyllaceae).
The genus *Caryocolum* Gregor & Povolný, 1954, includes about 70 described species. In Europe more than 50 species are recorded (Karsholt 2004), of which 28 occur in Italy; in Sicily only two species are dubiously recorded (Huemer & Karsholt 1995; Karsholt & Huemer 1995). Species of the genus *Caryocolum* have specialized in feeding exclusively on plants of the family Caryophyllaceae (Huemer 1988).

Abbreviations

TLMF Tiroler Landesmuseum Ferdinandeum, Innsbruck, Austria
ZMUC Zoologisk Museum, University of Copenhagen, Denmark

Caryocolum siculum sp. n.

Material. Holotype: ♂, **Italy**, Sicily, Prov. Catania, Iblei Mts., Vizzini, Contrada Rubalà, surroundings of Poggio del Vecchio, 320 m, 22.vi.2003, e.l. on *Gypsophila arrostii*, S. Bella leg. (genitalia slide 0074 S. Bella; coll. TLMF). – Paratypes: 1♀, same data as holotype, but 26.v.1999, e.l. on *G. arrostii*, S. Bella leg. (genitalia slide GU03/1202 P. Huemer; coll. TLMF); 4♂, 8♀, same data as holotype (including 1♀, 3♂ genitalia slides) but 22.vi.–7.vii.2003, e.l. on *G. arrostii*, S. Bella leg. et coll.; 3♂, 4♀, same data as holotype, but 15.–20.vi.2004, e.l. on *G. arrostii*, S. Bella leg. et coll.; 5♂, 4♀, Prov. Enna, Erei Mts., Agira, Vallone di Piano della Corte, Contrada Urselluzzo, 500 m, 20.–27.vi.2003 (including 1♀, 1♂ genitalia slides), e.l. on *G. arrostii*, S. Bella leg. et coll.; 1♂, 7♀, same data as holotype, but east of Lago Dirillo, 400 m, 27.iv.2006, e.l. on *G. arrostii*, leg. O. Karsholt (coll. ZMUC).

Diagnosis. The new taxon is well distinguishable from related species by its habitus and characters of the male and female genitalia. Genitalia characters are somewhat intermediate between species of the *petryi*-group and the *saginella*-group. As far as

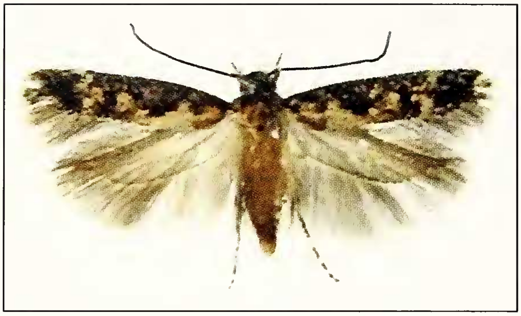
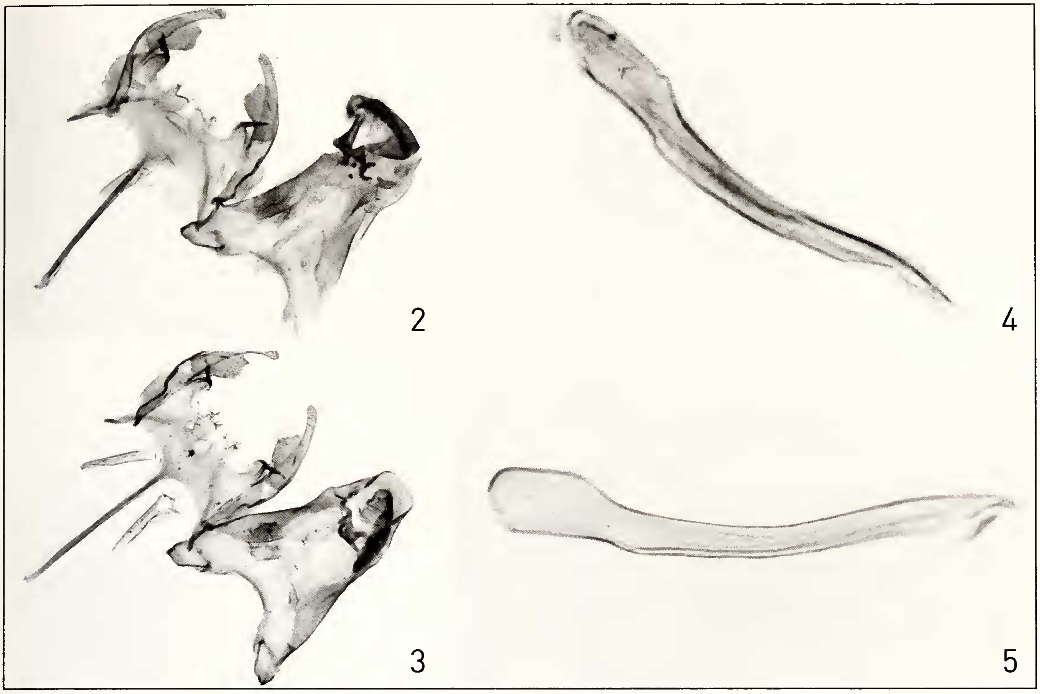


Fig. 1. *Caryocolum siculum* sp. n., holotype.

known species of theses groups are gall inducers in the larval stage. *C. siculum* sp. n. differs from the most similar species, such as *C. petryi* (O. Hofmann, 1899) and *C. inflativorella* (Klimesch, 1938), by the peculiar shape of the sacculus and the apically rounded tip of the valva, and in the females by the largely reduced sclerotized antrum.

Description of adult. Holotype, ♂ (Fig. 1). Wingspan 12 mm. Head ochreus, scales on vertex tipped dark brown with basal part ochreus. Labial palpi moderately recurved; second segment with median scales cream, outer surface with brush of short raised cream scales and with scattered brown scales; third segment dark brown mottled with cream scales. Antenna fuscous brown, alternately ringed dark brown and cream below; antennal scape with distal part cream. Thorax cream, prothorax and mesoscutellum apically dark brown. Tegula dark brown, distal part light brown. Forewing rather lanceolate; dark brown, scattered with cream scales, orange-brown spot in subbasal part, two irregular, large and fused spots from dorsal margin to central part of wing, cream costal and tornal spots usually confluent forming fascia or separate by distinct brownish orange spot; fringes ochreus with distinct brown apical cilia. Hindwing light greyish brown, fringes ochreus. Underside of forewing light brown. Underside of hindwing whitish with light brown anterior margin. Foreleg with coxa and femur dark brown, tibia and tarsus dark brown mottled with whitish, with whitish final ring at distal part of each segment; midleg whitish mottled with few brown scales on outer side, tibia and tarsus as foreleg; hindleg with outer side dark brown scattered with whitish, spurs and inner side whitish, dorsal whitish scales of tibia elongated. Abdomen cream.
♀ similar to ♂, body size slightly larger.
♂ genitalia (Figs 2–5). Valva long, slender, weakly curved, rounded at tip; sacculus two-thirds length of valva, broad, with small, pointed tip; vinculum stout, posterior margin undulated, with pair of almost rectangular projections, medial incision slight; saccus long, slender; transtilla with few minute spines; anellus with pair of long sclerotizations; phallus long, slender, moderately S-curved, apically with minute cornuti.
♀ genitalia (Figs 6–9). Eighth segment without process; ventromedial plate with folds, two lateromedial pairs well developed; apophyses posteriores about three times length of apophyses anteriores; antrum broad, short, funnel shaped; ductus bursae with pair of long narrow lateral sclerotizations; signum of medium size with large base and short, strong, moderately curved hook.
Immature stages. Larva (Fig. 10). Length of mature larva 10 mm. Body pale yellow. Head black with 6 pale yellow ocelli. Prothoracic plate well sclerotised, black, with distinct medial sulcus, line of internal margin not homogeneous. Prothorax with light brown spot around the three prespiracular setae. Thoracic legs well devel-



Figs 2–5. *Caryocolum siculum* sp. n., male genitalia. **2**. Holotype, PG 0074 (phallus removed). **3**. Paratype, PG 0083 (phallus removed). **4**. Phallus, enlarged, dorsolateral view, PG 0082. **5**. Phallus, enlarged, lateral view, PG 0083.

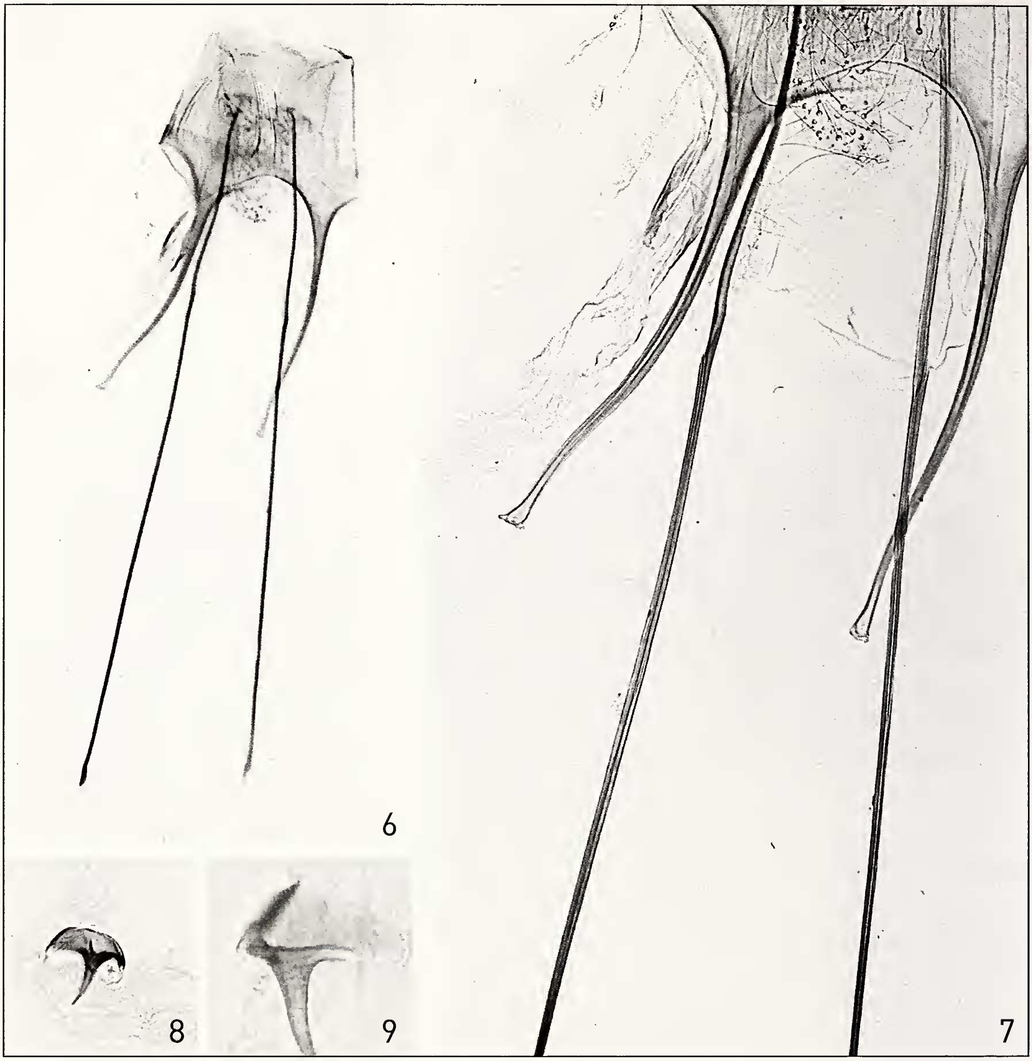
oped; first and second pairs dark brown with inner side pale yellow, third pair light brown with inner side pale yellow. Spiracles of prothoracic and abdominal segment 8 with narrow rounded dark brown area. Prolegs (3–6 and 10 abdominal segments) cylindrical, reduced, with complete crown of small brown crotchets arranged biordinally (on anal prolegs anterior half of crown absent). Anal plate brown.

Pupa (Fig. 11). General characters as reported by Patočka (1989); 6.0–8.5 mm in length; uniformly reddish brown; cremaster dorsally with two triangular projections in lateral position.

Distribution. Central and South-Eastern Sicily (Italy). Iblei Mountains, Province of Catania, Vizzini, Contrada Rubalà, surroundings of Poggio del Vecchio, 320–400 m (UTM VB 7508). Province of Enna, Erei Mountains, Agira, Vallone di Piano della Corte, Contrada Urselluzzo, 500 m (UTM VB 5767).

Etymology. The name *siculum* refers to the island on which the new species was discovered.

Life history. The larva lives and feeds in the stem of the hostplant, causing an internodal gall (Fig. 12 a). The diameter of the *Gypsophila* stems is about 2–3 mm, whereas the stems with the galls are 4–6 mm wide. The length of the internodes varies from 20–50 mm; inside the gall the free space where the larva lives is 15–18 mm. The larva pupates within the feeding-place where it prepares an emergence hole; the pupa is not extruded on emergence. The shape of the hole in section is circular, with a diameter of



Figs 6–9. *Caryocolum siculum* sp. n., female genitalia. **6**. Allotype, PG 0075. **7**. *Idem*, enlarged. **8**. *Idem*, signum, enlarged, dorsal view. **9**. Signum, enlarged, lateral view, PG 0081.

mm. The opening of the hole is free, but using setae and few small fragments of fibre of the stem (only on the outer surface) the larva builds a thin cover near it–with the lateroposterior margin fixed to inside walls of the gall whereas the anterior margin is easily lifted (Fig. 12 b). The larva can be found from April to late June. The possibility to breed larvae at different stages simultaneously allowed making some observations on the biological cycle. Some galls with mature larvae, taken from their natural habitat, were transferred to the laboratory and bred under natural environmental conditions. Biological data were obtained from continuous observations carried out on four mature larvae just before they pupated. Two larvae pupated on 15.vi.2003, both remaining in this stage for 18 days at an average daily temperature of 28°C; the emerging adult females

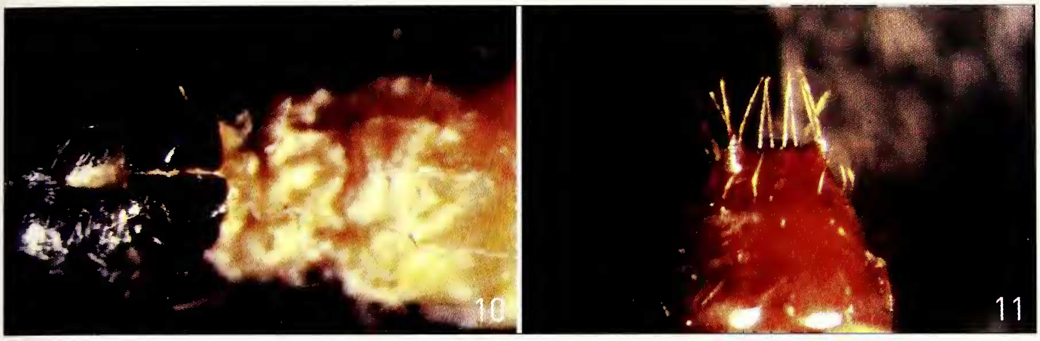


Fig. 10–11. *Caryocolum siculum* sp. n.. **10**. larva: head and prothoracic plate. **11**. pupal cremaster, dorsal view.



Figs 12. *Caryocolum siculum* sp. n., gall. **a**. Stem of *Gypsophila arrostii* with an internodal gall; **b**. Vertical section showing the horizontal cover near the opening.

survived 36 and 30 days respectively at an average daily temperature of 28.5°C. Another larva pupated on 4.vi.2003, remaining in this stage for 18 days, at an average daily temperature of 25.5°C; the resulting adult male survived for 24 days at an average daily temperature of 28°C. The last larva pupated on 22.vi.2003 at an average daily temperature of 28°C and the adult emerged after 16 days. The average daily temperature was calculated over 24 hours; moreover, the days of survival of adults refer to specimens that were not fed. Despite the high number of obtained specimens, no mating and no oviposition were observed in the laboratory despite the presence of host plants. In its habitat the moth rests during the day on the substratum, between leaf-litter and rocks. Because of its mimetic colouration it is very difficult to see; if disturbed, it flies quickly for short distances. After numerous years of nocturnal collecting with mercury-vapour lamps at the type locality no specimen was ever collected. In the laboratory the adults do not seem to be phototropic. This species seems to be univoltine like other species of the genus.

Ecology. *Gypsophila arrostii* is a characteristic species of thermo-xerophilous perennial steppic grasslands of South Italy and Sicily (Fig. 13). It is currently ascribed to the association *Avenulo-Ampelodesmion mauritanici* Minissale where the dominant species is *Ampelodesmos mauritanicus* (Poiret) Dur. et Sch. (Minissale 1995).

A recent floristic study (Turrisi 1999) recorded 406 species of vascular plants for the territory of the Vizzini river valley, but only four Caryophyllaceae: *Silene vulgaris*



Fig. 13. Type locality of *Caryocolum siculum* sp. n. on Sicily, Iblei Mountains, Vizzini, Contrada Rubalà, 320–400 m.

(Moench) Garcke, *S. alba* (Miller) Krause, *S. fuscata* Link and *Gypsophila arrostii* Guss. The latter, dedicated to the Sicilian botanist A. Arrosto, is a suffrutex with an Eastern-Mediterranean distribution that grows on calcareous and sedimentary soils from 0 to 800 m a.s.l.; in Italy it is presently recorded only from four meridional regions: Apulia, Lucania, Calabria, and Sicily (Pignatti 1982).

Remarks. In both collecting sites much human activities affect the conservation of ecosystems. The main problems are pasture, reforestation, and fires. The site near Agira is included in the Nature Reserve of "Vallone di Piano della Corte", whereas for the area of Vizzini the WWF recently requested that the regional authorities protect the territory through the establishment of a new nature reserve.

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